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(54) RESIN COMPOSITION

(57)Abstract

PROBLEM TO BE SOLVED: To provide a resin composition for forming an excellent coating at a fast curing speed and with corrosion resistance, adherence, curability, solvent resistance and curing product properties by compounding an alkoxy silane compound and a modified epoxy resin added another alkoxy silane compound.

SOLUTION: A resin composition is obtained by compounding an alkoxysilane compound represented by the formula (wherein RI is 1–4C alkyl. R2 is R10-/1. –8C alkyl and dryl; n is an integer of 1–10) into an epoxy compound having at least two epoxy groups, and a compound having at least one alkoxysily group and at least one epoxy group in a molecule and a modified epoxy resin (C) added a carboxylic acid according to demand. The epoxy compound is preferably aliphatic polyglycidyl ether particularly. The modified epoxy resin (C) is desirable to contain at least 10 mole% of a dicarboxylic acid on the basis of the whole carboxylic acid. A weight ratio of the modified epoxy resin/ the alkoxysilane compound is preferably 10/1–1/5.

* NOTICES *

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[Claim 1]A resin composite which consists of a following (b) ingredient and a (**) ingredient.

(**) The modified epoxy resin (**) following produced by adding (e) carboxylic soid to an epoxy compound which has two or more epoxy groups in the (a) molecule a compound which has a basis which can react to one or more alkoxy sityl groups and one or more apoxy groups in the (b) molecule, and if needed A compound expressed with general formuls (I) of [the-izing 1] [Ohemical formuls 1]

R,0+Si-0-R

OD中、R. は災害数1~4のアルキル基を表し、R. はR. 0~、技

和数1~8のアルキル核体だはアリール状を近し、ロは1~10を表

Claim 2](b) The resin composite according to claim 1 whose basis which can react to an epoxy group of an

Claim 3](**) The resin composite according to claim 1 or 2 whose ingredient is the addition to which the b) ingredient is added in the range of 0.1-1.0 Eq of active hydrogen to 1 Eq of epoxy groups of the (a) ngredient is an amino alkyl group.

Claim 5](**) The resin composite according to any one of claims 1 to 4 whose ingredient is the addition to which the (c) ingredient is added in the range of 0.1-0.9 Eq of carboxyl groups to 1 Eq of epoxy groups of Claim 4](**) The resin composite according to any one of claims 1 to 3 which is an addition in which an Claim 6](a) The resin composita according to any one of claims 1 to 5 whose epoxy compound of an ngredient added the (b) ingredient and the (c) ingredient to the (a) ingredient. ha (a) ingredient.

Claim 7](c) an ingredient -- dicarboxylic acid -- more than 10 mol % of all the carboxylic acid components (Claim 8](b) The reain composite according to any one of claims 1 to 7 whose blending ratios of an ingredient and a (**) ingredient are (b)/(**) = (0/1-1/5) in a weight ratio. - the resin composite according to any one of claims 1 to 6 which is what is included. ngredient is aliphatic series poly glycidyl ether.

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DETAILED DESCRIPTION

Detailed Description of the Invention]

Field of the Invention[The allows glane compound in which this invention has an overly group and a research group in an ecosy consourced in detail about a restin composite, And it is related with the resin composite which can give the cost excellent in the arti-corresionese, the advention, hardenability, and solvent relatations which consists of the modifice posty resist and expoy group which are produced by adding explosively and all recedy, and a norm suponive allowy alians compound.

[002] |Description of the Prior Art/Since (t excels in an adheave property, heat resistance, chemical resistance, |and electrical property, a mechanical characteristic, etc. over a various substrata, the spoxy resh is

nn experient property, a mentalment was a consistent or a more a more account or the consistent of the

board; is immiffeed, and it is, to compensate these faults, the trial which is going to make an epoxy resin the fact of the content of the compensate these faults, the trial which is going to make an epoxy resin the content of the compensate of the compensate the compensate of the compensate of the compensate of the compensate which has an armine also, group and an also or group, and the the cognities also compensate the compensate which has an armine also, group and an also or group, and the the cognities also compensate the compensate

intrinsions and interest allows by prope as misse for teamper, whether a stricts were income or no compared fields may be applied to the property of the prope

[0005]Therefore, the purpose of this invention has a quick cure rate, and there is in providing the resin composite which can give the paint excellent in anti-corrosiveness, adhesion, hardenability, solvent

resistance, and hardened material physical properties. [0006]

UNDAI
[Makes for solving problem]. The alloay silane combound which has an epoxy group and a reactant group in
an expoxy compound as a resident de this investion present inspection shouthholdershedly. Not the
serial compounds which consists of the modified apoxy result and expoxy group which are produced by adding
enterboying and a prost and a prost group and which are produced by adding
enterpoying and a morn expensive also yellow abone or group of the above
mornional arrows and and resided this finention.

mentioned purpose could be attained, and reached this invention.

(1) That is, this invention provides the resin composite which consists of a following (b) ingradient and (49) ingredient.

(**) The modified goory resin (**) following produced by adding (6) cerbookin exist to the openy compound which has us to or more page groups in the for included be compound which has a busis which can reset to ence or more allowy spulls in the following groups in the following groups in the control moder compound which has a busis which can reset to ence or more above groups in the (b) molecule, and if model The compound expressed whit general formula (D of [the-tier & 2] (0008)

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JP,2000-11948RA [DETAILED DESCRIPTION] $R_2 \\ R_1 \ominus \leftarrow S_1 - O \cdot J_{\overline{p}} R_1 \tag{1}$

(5中、R・12数素型1~4のアルキル物を設し、R・14R・0~、数 業数1~8のアルキル線が2はアリード衛を返し、nは1~10を表 す。)

[6000]

The epoxidation thing of cyclic olefin compounds, such as a bis(3,4-epoxy-6-methylcyclohexylmethy))horse (bisphenol F), methylenebis (o-cresol), An ethylidenebisphenol, an isopropylidenebisphenol (bisphenol A), An nenenuciear polyhydric phenol compound or a polynuciear polyhydric phenol compound, poly glycidyl ether compound [of ECHIRENOKISHIDO and/or a propylane oxide addition]. The poly glycidyl ether compound acid, and methylene tetrahydrophtal acid, Glycidyl ester species [of aromatic series or alcoyole fellows polybasic acid] and homopolymer [of glycidyl methacrylete] or copolymer.N. and N-diglycidyl aniline. The nethane; Virylcyclohexene diepoxide, JISHIKURO pentanediene diepoxide, 3,4-epoxycyclohexylmethyl 3,4 lovolac, butylphenol novolac, octylphenol novolac, resorcinol novolac, The PORIGU lysyl-ether compound centaerythritol, Poly glycidyl ether of the polyhydric alcohol class of sorbitol, a bisphenol A-ethylene oxide addition, etc.; Maleic acid, Fumaric acid, itaconic acid, succinic acid, glutaric acid, suberic acid, adipic acid, spoxy cyclohexane carboxylate, 3,4-epoxy-6-methylcyclohexylmethyl-6-methylcyclohexane carboxylate, mackarel peat; Epoxidation polybutadiene, Heterooyolic compounds, such as epoxidation conjugated diane Mode for carrying out the invention]Hereafter, the resin composite of this invention is explained in detail tycol, Propylene glycol, a butylene glycol, hexandiol, polyglycol, Thiodiglycol, glycerin, trimethylolpropane, Aliphatic series, such as azelaic acid, sebacic acid, dimer acid, trimer acid, phthalic acid, isophthalic acid, [0010]As an epoxy compound which is the (a) ingredient of this invention, For example, the poly glycidyl thans, Thiobis phenol, a sulfobisphenol, a oxybisphenol, phenol novolac, orthocresolnovolak, ethylphenol prephthalic soid, trimellitic acid, trimesic acid, pyromellitic acid, tetrahydrophtal acid, hexahydrophthalic sopropylidenescrew (o-cresol), tetrabromobisphenol A. A 1,3-screw (4-hydroxy cumyl benzene), a 1.4of the hydrogenation thing of the above-mentioned mononuclear polyhydric phenol compound; Ethylene spoxy compound which has glycidyl amino groups, such as bis(4-(N-mcthyl-N-glycidyl amino) phenyl) crew (4-hydroxy cumy) benzene), 1,1,3-trls(4-hydroxyphenyl) butane, 1,1,2,2-tetra(4-hydroxyphenyl) polymers, such as epoxidation styrene butadiene copolymer, and trigholdyl isocyanurate, are raised. pyrocatechol, and fluoro GURUKUSHI Norian; Dihydroxynaphthalene, Biphenol, methylenebis phenol ether compound of mononuclear polyhydric phenol compounds, such as hydroquinone, resorcinol, of polynuclear polyhydric phenol compounds, such as terpenediphenol; To the above-mentioned

incircula insigne construction of these spexy resine could be carried out by the prepolymer of the end incircular insigned construction of these spexy resine could be carried out by the prepolymer of the construction along voluments, essential rightheir series do pelicity detail. When explained out disciplinations and or look problet detail or propriete colde details and look problet detail or frequencements betalended and used, enter the resist composition and look problet detail or frequencements betalended and used in our less an extent entering the series consistent and problet of the interior in the details to a best material, the is obtained, it is executely destable.

[500] Zilhe exposition controlled the problem of the properties of the properties of the properties of the properties of the properties.

offset on this desired member physical provedient of this invention is a compound which has in a molecule a basis which the many of the bit provedient of the bit invention is a compound which has in a molecule a basis which compound of the bit invention is the provenient of the bit invention in the maniform of the provenient of the pr

P,2000-119488,A [DETAILED DESCRIPTION]

mentioned (a) ingradient, since the adhesion of an ingredient to various raw materials improves more by [00]4](**) of this invention -- although it adds the above-mentionad (b) ingredient to the abovenethyldiethoxysilane, etc. are raised.

10015]although the carboxylic acid more than mono- ** JI and trivalent is raised as carboxylic acid of tha and more than 10 mol % --- by using it, since the effect of improving film properties, such as adhesion and abova-mentioned (c) ingredient — dicarboxylic acid — the inside of all the carboxylic acid components, adding (c) carboxylio acid furthar, it is desirable.

chebuille acid, KVPIRO line acid, indropelmis cells, Liberde acid, Trauzia acid, ETETERIN said, myritotoloc acid, melline acid, acid of arachidonic acid, chupanodonic acid, herring acid, ricinoleic benzolo acid, toluic acid, etc., branching, or 1-30 annular carbon atoms is raised, suitably, What contains in a molecule the unsaturated carboxylic acid saturation or unsaturation monocarboxylic sold which can be replaced with hydroxyl with the straight chain which has a double bond is preferred, divides, and as monocarboxylic sold, That the unsaturated carboxylic For example, sorbio soid, the transformer 2, ***** 4-decadencio acid, the transformer 10, transformer 12-octadecanoic acid, Natural fat acid, such as alpha-eleostoaric acid, beta-eleostearic acid, and punicle acid, sold, fumario soid, maleio acid, and decano dicarboxylio soid, is raised. Long-chain dicarboxylio soid is preferred and as such a thing especially, for example Dimer soid (hydrogenation) etc., Or P-1013 (made by the above-mentioned dicarboxylic acid, For example, acetic acid, butanoic acid. a valeric acid, caproic acid, enanthic acid, caprylic acid, 2-ethylhexyl acid, pelargonic acid, noc decanoic acid, capric acid, Undecanoic carboxylic acid which is preferred and has a conjugate double bond more than a couple in these molecules. ydroxysteano acid. Arachin acid, behenic acid, lignoceno acid, acrylic acid, methacrylic acid, Cerinic acid, [0016]As dicarboxylic acid, here, for example Oxalic acid, malonic acid, succinic acid, Glutaric acid, adipic Jniqema), P-1025 (made by Uniqema), IPU-22 (product made from Okamura Oil Mill), ULB-20 (product acid, pimelio acid, suberio acid, azelaio acid, Saturation or unsaturated dicarboxylic acid, such as sebacio 0017] As carboxylic acid other than the above, or other carboxylic acid which can be used together with acid which has a conjugate double bond more than a couple is included in a molecule as unsaturated or synthetic unsaturated fatty acid ********* which has a conjugate double bond with 5-22 carbon acid, laurio acid, tridecanoic acid, myristic acid, pulmitic acid, isosteario acid, stearic acid, 12made from Okamura Oil Mill), etc. can use conveniently as a commercial item. solvent resistance, becomes remarkable, it is desirable.

easily and the reaction 2, Tha alkoxy aliane compound of the (b) ingradient can be added to the reactant of [0010](a) Although not limited from an ingredient the (b) ingredient and the (c) ingredient especially conneming the method of manufacturity the modified epocy resin of a (b) ingredient, suitably. After making the (s) ingredient and the (c) ingredient and the (c) ingredient and the (c) ingredient react if reacted (reaction 1) and connidering it as a partial When the reaction 1 and the reaction 2 are shown atill in detail, the reaction 1. The spoxy compound of an ingredient, the carboxylic sold of the (a) ingredient, and also if needed (a) An esterification catalyst, By making it react at 80–150 ** in a non-solvant or a solvent, can use polymerization inhibitor, oan carry out the above-mentioned (a) ingredient or the (a) ingredient, and the (o) ingredient, and it can carry out easily esterification epoxy compound, it is easily manufactured by making the (b) ingredient react (reaction 2). by making it react at 80–150 ** in a non-solvent or a solvent. [0019](**) of this invention — as for especially the modified epoxy resin of an ingredient, it is preferred

acquired. It is preferred that 0.8 Eq or more of sum total addition amounts of the active hydrogen of the (b) (c) ingredient may have an adverse effect on hardenability or coat parformance in less than 0.8 Eq. it is not amount of an ingredient is less than 0.1 Eq. there is a possibility that the effect by using it may not fully be when also making the (c) ingredient add, it is preferred that 0.1-0.9 Eq of carboxyl groups are the range of 0.2-0.85 Eq about the (c) ingredient to 1 Eq of epoxy groups of the (a) ingredient (c) When the addition that the (b) ingredient is added to 1 Eq of epoxy groups of the (a) ingredient in the range which is 0.2-0.9 Eq as for 0.1-1.0 Eq of active hydrogen. (b) When the addition amount of an ingredient is less than 0.1 Eq. there is a possibility that the solvent resistance of a coat may fall. As for especially the addition amount, groups of the (a) ingradient. (b) And since there is a possibility that the sum total addition amount of the ngredient and the carboxyl group of tha (c) ingredient are especially 0.9 Eq or more to 1 Eq of epoxy

[0020]Here as an esterification catalyst used in the above-mentionad reaction 1, For example, lithium

nttp://www.f.ipdl.inpit.go.jp/ogi-bin/tran.web_cgi_ejje?atw_u=http%3A%2F%2Fwww.f.ipdl.inpit.go... 2010/10/19 methacrylate, potassium carbonate, magnesium oxide, Zine chloride, boron fluorida, an aluminium chloride,

triethylamine, 1, secondary amine, trimethyl benzylammonium chlorida, the 4th class amine. The 4th class piphenyi SUCHIBEN, vanadium chloride, phenothiazin, ohrome oxide, an organic acid chromium compound chloridation tin, N.N-dimethylbenzylamine. The third class amine, such as N.N-dimethyl phenylamine and chromium, an amide compound, triphenyl phosphine, Phosphorus compounds, such as tributyl phosphine, 0021]As polymerization inhibitor used in the above-mentioned reaction 1, For example, p-benzoquinone anthraquinone, a naphthoquinone, phenan surra quinone, p-xylo quinone, p-toluene, 2,6-dichloroquinone, pyridinium salt, N.N-dimethylethanolamine, dimethylamino methacrylate, 4th class ammoniumchloride + 2.8-diphenyl-p-benzoquinone, 2.5-diacetoxyp-benzoquinone, 2.5-dicaproxy-p-benzoquinone, Quinone, phosphonium salt, N-N phanylnaphthylamina, an anion exchange resin and pyridine, The 4th olass ferrio chloride, iron hydroxide, an anion exchange resin, etc. are raised.

outylhydroquinone, Hydroquinone, such as monomethyl hydroquinone and 2,5-di-tert-amylhydroquinone;

such as 2,5-Zia ******* p-benzoquinone; Hydroquinone, p-t-butylcatechol, 2,5-di-tert-

obyl, and xylyl, are raised as an aryl group. As these alkoxy silane compounds, for example A tetramethoxy trintrotoluene, and pioric soid, and cyclohexanone dioxime; A clo pen, Phenothiazin etc, are raised, [002]As an alkyl group which the (**) ingredient of this invention is an alkyly group which the (**) ingredient of this invention is an alkyly group which the (**) nothy), ethyl, propyl, butyl, pentyl, hexyl, haptyl, octyl, bonzyl, eto. are raised, and bases, auch as a phonyl Di-t-butyl PARAKU resol, Copper compounds, such as phenols; naphthene copper, such as hydroquinone [0023]in this invention, the blending ratio of a (b) ingredient and a (**) ingredient. It is preferred (b)/(**) with the above-mentionad general formula (I), and is expressed with R1. For example, as an alkyl group monomethyl ether and alpha-naphthol: Phenyl-beta-naphthylamine, Paraben JIRUAMINO phenol, a diwhich bases, auch as methyl, cthyl, propyl, and butyl, are raisad and is expressed with R2., For example, beta-naphtfryl p phenylenediamine, Oxime, such as nitro compound; quinonedioxime, such as amines; nilane, A tetraethoxysilane, tetra propoxysilane, tetra butoxysilane, Methyl trimetoxysilane, methyl dinitrobenzenes, such as dibenzylhydroxylamine, phenylhydroxylamine, and diethylhydroxylamine, rriethoxysilane, a methyl tripropoxy silane, Methyl bird butoxysilane, ethyltrimethoxysilane, ethyltriethoxysilane, propyltrimethoxysilane, propyl triethoxysilane, phenyltrimethoxysilane, shenyltriethoxysilane, these condensates, etc. are raised.

=10 / 1 - 1/5, and that it is especially the range of 5 / 1 - 1/3 at a weight ratio, and the hardened material [0024]here — (**) — the alkoxy silans compound which is an ingredient, and (**) — although it does not limit in particular for a mixed stage with an ingredient, since teaching a (**) ingredient when adding the (b) 0025]t can be dissolved in an organic solvent by the resin composite which consists of the (b) ingredient which was more excellent in hardenability and was excellent in film properties, such as adhesion, a water 0026]As the above-mentioned organic solvent, for example Methyl ethyl ketone, methyl amyl ketona, A listhyl ketone, acetone, mathyl isopropyl ketone, propylene-glycol-monomethyl-ather acetate, Ketone, resisting property, and solvent resistance, by being used together in this range can be provided. ingredient to the (a) ingredient can also act as a reactional solvent, it is effective. and (**) ingredient of this invention if needed.

such as cyclohexanona: A tetrahydrofuran, 1, 2-dimethoxyethane, Ether, such as 1,2-diethoxyethane; Ester [0028]A polymerization nature monomer, a film formation suxiliary agent, etc. can be blended with the resin product made from Exon Chemistry): A carbon tetrachloride, Halogenated aromatic hydrocarbon, such as nalogenated aliphatic hydrocarbon; chlorobenzene, such as chloroform, trichloroethylene, and a methylene 0027]0-200 weight-section use of the amount of the above-mentioned organic solvent used is preferably arried out to total quantity 100 weight section of (b) and a (**) ingredient. When the amount of this shloride; aniline, triethylamine, pyridine, dloxane, acetio acid, acetonitrile, carbon bisulfide, etc. are raised. species; **** or n-butanol, such as athyl acetate and n-butyl acetate. Alcohols, such as **** or nproduct made from KOSUMO Matsuyama Petroleum), Paraffin series solvents, such as Solvesso #100 urpentine, D-limonene, Terpene hydrocarbon oils, such as pinene; A mineral spirit, SUWAZORU#310 propanol, and amyl alcohol; Benzene, Aromatic hydrocarbon, auch as toluene and xylene; Spirit of used] exceeds 200 weight sections, since it volatilizes and danger, hazardous property, etc. are generated, it is not desirable.

[0029]As the above-mentioned polymerization nature monomer, ecrylic acid, methacrylic acid, methacrylic [0030]As the above-mentioned film formation auxiliary agent, an acrylic astar copolymer, a polyvinylidene chloride, a styrene acrylonitrile copolymer, a vinyl copolymer, a vinyl acetate copolymer, an acrylic silicon acid hydroxy alkyl eater, etc. are raised, for example. copolymer, etc. are raised, for example. composite of this invention.

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IP.2000-119488,A [DETAILED DESCRIPTION]

0031]There is no restriction in particular in the method of preparing a paint using the resin composite of this invention, and the usual method of preparing a general paint can be used. After the obtained paint blends a curing catalyst or an initiator, it can be applied with a spray system, brush coeting, and roller 0032] As the above-mantioned curing catalyst, here, for example Calcium naphthanata, copper coating, and can make a coat form ordinary temparature or by making it heat and harden.

naphthonate, Manganese naphthenate, lead naphthenete, cobsit naphthenate, naphthenio aoid tin, They ere lead octylate, octylic acid cobalt, and tin octylate, etc., and as the above-mentioned initiator, For example, yydro-peroxide, such as cumene peroxide. Diacyl peroxide, Ketone peroxide, such as methylethyl peroxide raised by carboxylic soid matal sait, such as octylic soid calcium, copper octylate, octylic soid manganesa and benzoyl peroxide: Peroxy carbonate:1, such as bis(4-tertiary butyl cyclohexyl)peroxy carbonate, the

outylperoxycyclohexane of 1.1-Ji, peroxy ester or these mixtures, such as the third butylperoxy benzoate and third butylperoxy 2-ethylhexanoate, etc. can be used. [0038]To the resin composite of this invention, if needed Monoglycidyl ether. Dioctyl phtholate, dibutyl hird butylperoxy 3 and 3 of 1-JI, 5-trimethylcyclohexane, Peroxy ketals, such as the third

co various metal, lesther, glass, rubber, a plastio, a tree, cloth, paper, etc.; The adhesive tape for a package, CHIKISOTOROPIKKU agent, fire retardant, defoaming agent, rust preventives, such as graphite, iron oxide, and a bitumen substance; Colloidal allica, The additive of daily use of colloidal elumina etc. may be 0034]The resin composite of this invention, for example Conorete, cement mortar, The paint or adhesives A pressure sensitive adhesive lebel, a frozen-fooda label, a removal label, a POS label, adhesion wallpaper, contained and the adhesive resin of xylene resin, petroleum reain, etc. can also be further used together. Glass fiber, Carbon fiber, cellulose, silica, cement, kaolin, clay, aluminium tydroxide, Bentonite, tale, silica, impalpable powder silica, a titanium dioxide, carbon black. A bulking agent or paints; thickening agent. ohthalate, benzyl alcohol, The diluent of reactivity or nonresponsiveness, such as coal tar (plasticizer); The binder of adhesion flooring. Art paper, a light weight coat paper, a cast-coated paper, coeting

such as a carbonless copying machine and an impregnated paper, a synthetic fiber, glass fiber, carbon fiber, paperboard, Fiber processing agents, such as convergence agents, such as converted paper, natural fibers. and a metal fiber, a fray inhibitor, and a processing agent; although it can be used for extensive uses, such Especially since the coat excellent in anti-corrosiveness, adhesion, hardenability, and solvent resistance as building materials, such as a sealing material, cement admixture, and a water blocking material, can be given, it is used for the use of a paint.

Working example. Although an embodiment, a comparative example, and the example of a use examination are shown and the resin composite of this invention is explained still in detail hereafter, this invention is

[0036]ambodiment I ADEKA rasin EP-4005 (by Asahi Danka Kogoo KK. — the spividsk there compound of the propylene oxide addition of bilandam A.) Wishinger equoy equivienint 255 410s, KBE-408 (groduot made from Shirte-sta weight per opoxy equivalent had exceeded 100,000, and the reaction was ended. This was cooled to 80 ** batramethyl silicate oligomer) 450g are taught, It reacted at 90-100 ** for 5 hours, it checked that the not limited to these.

the weight per epoxy equivalent had exceeded 100,000, and the reaction was ended. This was cooled to 80 (BE-903 here. 54 g and MS-51 450 g was taught, and it reacted at 90-100 ** for 5 hours, it checked that mmHg or less for 3 hours, and checked that they were the weight per epoxy equivalents 900-950. It is 50 g of ethanol was added, it mixed for 30 minutes, and the restin composite 1 was obtained, and obtained, and adjoint-indediment 2 ADGAC varies Fa-0405 371g and P=1013 (Unique; ...—dimar and) Taught and oppivalent 25 8 g and 0.25 g of tripheny) phosphine, and it was mate to react by 130-140 +4 and 30

3 hours, and checked that they were the weight per epoxy equivalents 1000-1050. It is KBE-903 here. 54 g and MS-51 450 g was taught, and it reacted at 90-100 ** for 5 hours, it checked that the weight per epoxy of the propylene oxide addition of bisphenol A.) Weight per epoxy equivalent 325 301g and P-1013 Taught 145 g and 0.25 g of triphenyl phosphine, and it was made to react by 130-140 ** and 30 mmHg or less for 0038]embodiment 3 ADEKA resin EP-4000 (; by Asahi Denka Kogyo K.K. — the glycidyl ether compound ex, 50 g of ethanol was added, it mixed for 30 minutes, and the resin composite 2 was obtained.

3 hours, and checked that they were the weight per epoxy aquivalents 1000-1050. It is KBE-903 here. 54 g was added, it mixed for 30 minutes, and the resin composite 3 was obtained. [0039]embodiment 4 ADEKA resin EP-4005 288g and ADEKA resin EP-4100 (; by Asahi Denka Kogyo K.K. 09 g and 0.25 g of triphenyl phosphine, and it was made to react by 130-140 ** and 30 mmHg or less for - the glycidyl other compound of bisphenol A.) Weight per epoxy equivalent 190 48g and P-1013 Taught equivalent had exceeded 100,000, and the reaction was ended. This was cooled to 80 **, 50 g of ethanol

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and MS-51 450 g was taught, and it reacted at 90-100 ** for 5 hours, it checked that the weight per epoxy equivalent had exceeded 100,000, and the resotion was ended. This was cooled to 80 **, 50 g of ethanol phosphine, and it was made to react by 130–140 ** and 30 mmHg or less for 3 hours, and checked that exceeded 100,000, and the reaction was ended. This was cooled to 80 **, 50 g of ethanol was added, it they ware the weight per epoxy equivalents 600–650. It is KBE-903 here. 76 g and MS-51 450 g was aught, and it reacted at 90-100 ** for 5 hours, it checked that the weight per epoxy equivalent had [0040] Embodiment 5 ADEKA rasin EP-4005 416 g and P-1013 Taught 30 g and 0.25 g of triphenyl was added, it mixed for 30 minutes, end the resin composite 4 was obtained. mixed for 30 minutes, and the resin composite 5 was obtained.

and it was made to react by 130–140 ** and 30 mmHg or less for 3 hours, and checked that they were the reacted at 90-100 ** for 5 hours, it checked that the weight per epoxy equivalent had exceeded 100,000, and the reaction was ended. This was coolad to 80 **, 50 g of cthanol was added, it mixed for 30 minutes, ınsatureted-dicarboxyllo-acid mixture.) Taught acid equivalent 183 56g and 0.25 g of triphenyl phosphine. [0041]Embodiment 6 ADEKA resin EP-4005 306 g and P-1013 Taught 140 g and 0.25 g of triphenyl phosphine, and it was made to react by 130-140 ** and 30 mmHg or less for 3 hours, and checked that weight per epoxy equivalents 1000-1050. It is KBE-903 here, 56 g and MS-51 450 g was taught, and it hey were the weight per epoxy equivalents 4000-4050. It is KBE-903 here, 12 g and MS-51 450 g was exceeded 100,000, and the reaction was ended. This was cooled to 80 **, 50 g of ethanol was added, it aught, and it reacted at 90-100 ** for 5 hours, it checked that the weight per epoxy equivalent hed 0042]embodiment 7 ADEKA resin EP-4005 390g and IPU-22 (; made from Okamura Oil Mill -- an mixed for 30 minutes, and the resin composite 6 was obtained. and the resin composits 7 was obtained.

and it was made to react by 130-140 ** and 30 mmHg or less for 3 hours, and checked that they were the and the reaction was ended. This was cooled to 80 **, 50 g of ethanol was added, it mixed for 30 minutes. unsaturated-dicarboxylic-acid mixture.) Taught acid equivalent 171 54g and 0.25 g of triphenyl phosphine. eacted at 90-100 ** for 5 hours, it checked that the weight per epoxy equivalent had exceeded 100,000, weight per epoxy equivalents 1000-1050. It is KBE-903 here, 54 g and MS-51 450 g was taught, and it 0043]embodiment 8 ADEKA resin EP-4005 392g end ULB-20 (; mada from Okamure Oil Mill --- an and the resin composite 8 was obtained.

[0044]Embodiment 9 ADEKA resin EP-4005 372 g and ULB-20 54 g. High dicne (the product made from KF the weight per epoxy equivalent had exceeded 100,000, and the reaction was andad. This was cooled to 80 2500-2550. KBE-90389g and MS-51450g were taught here, and it reacted at 90-100 ** for 5 hours, it checked that the weight per epoxy equivalent had exceeded 100,000, and the reaction was ended. This was mmHg or less for 3 hours, and checked that they were the weight por opoxy equivalents 2500-2550. It is KBE-90354g and MS-51 here. 450 g was taught, and it reacted at 90-100 ** for 5 hours, it checked that dimer acid, acid equivalent 255) 63g, and 0,25 g of triphenyl phosphine, and it was made to react by 130-140 ** and 30 mmHg or less for 3 hours, and checked that they were the weight per epoxy equivalents grading, about 47 to 53% of main-ingredients 9,10-octadecadiencic acid) in addition, (about 34 to 40% of 0045]embodiment 10 ADEKA rasin EP-4080 (; by Asahi Denka Kogyo K.K. -- hydrogenation biaphenol ligycidyl ether.) Taught weight per epoxy equivalent 245 348g. P-1025 (Uniqema make; hydrogenation disconjugation octadecadienoic acid, monoene one, or 10 to 15% of saturated fatty acid). Taught acid equivalent 275 74g and 0.25 g of triphenyl phosphine, and it was made to react by 130-140 ** and 30 cooled to 80 **, 50 g of ethanol was added, it mixed for 30 minutes, and the resin composite 10 was e, 50 g of ethanol was added, it mixed for 30 minutes, end the reain composite 9 was obtained.

xcceded 100,000, and the reaction was ended. This was cooled to 80 **, 50 g of ethanol was added, it checked that they were the weight per epoxy equivalents 900-950. MS-51350g was taught here end it 0047]Comparative example 2 ADEKA resin EP-4005 Taught 496 g the dimer acid 131g and 0.25 g of nixed at 90-100 ** for 5 hours. This was cooled to 80 **, 25 g of ethanol was added, it mixed for 30 aught, and it reacted at 90-100 ** for 5 hours, it checked that the weight per epoxy equivalent had riphenyl phosphine, and it was made to react by 130-140 ** and 30 mmHg or less for 3 hours, and nixed for 30 minutes, and the comparison resin composite 1 was obtained minutes, and the comparison resin composite 2 was obtained.

0046]Comparative example 1 ADEKA resin EP-4005 392 g and KBE-903 83 g and 450 g of xylene were

nttp://www4.ipdl.inpit.go.jp/cgi-bin/tran_web_cgi_ejje?atw_u=http%3A%2F%2Fwww4.ipdl.inpit.go... 2010/10/19 [0048]The following axaminations were done using the reain composites 1-10 obtained by the example of use exemination above-mentioned embodiment, and the comparative exemple, and the comparison resin composites 1-2. However, in the case where the comparison resin composite 2 obtained by the

comparative example 2 is used, tricthylenetetramine was used together by the ratio of weight per epoxy squivalent/active hydrogen =1/1

sheet, it was neglected on the 1st, the cured film was created, and the following standard estimated the 0049](Toluene-proof nature) The rasin composite was applied by 100-micrometer thickness on the tin stata of the coat after performing toluane rubbing to this 10 times. The coat remains thoroughly.

1 which 2 coat which 3 coat which the cost will not dissolve slightly (5% or less of area) will not dissolve [0050](Water resisting property) The resin composite was applied by 100-micrometer thickness on the tin sheet, it was neglected on the 1st, the cured film was created, and the following standard estimated the for a while (6 to 20% or less of arca) will not dissolve mostly (not less than 21% of area) : a coat is lost.

state of the coat after immersion for this for three days in water. 4; A float is seen for a coat slightly (5% or less of area). 5: With [a coat] no abnormalities

There are many coats (not less than 21% of area), and a float is seen. A float is seen for a coat for a while (6 to 20% or less of area).

thickness on a mortar board, it was neglected on the 1st, the cross cut of the cured film was created and carried out, the following standard estimated the pealing condition in the tape (mortar adhesion), and this 0051](Mortar adhesion, mortar secondary adhesion) A resin composite is applied by 100-micrometer A coat separates thoroughly.

was similarly evaluated to the coat after immersion for three days in water (mortar secondary adhesion). A float is seen for a coat slightly (5% or less of area). With [a coat] no abnormalities.

There are many coats (not less than 21% of area), and a float is seen. A float is seen for a cost for a while (6 to 20% or less of area).

thickness on the light-calcium-carbonate board, it was neglected on the 1st, the cross out of the oured 0052](Light-calcium-carbonate board adhesion) The resin composite was applied by 100-micrometer A coat separates thoroughly.

film was created and earried out, and the following standard estimated the peeling condition in the tape. 4: A float is seen for a coat slightly (5% or less of area). With [a coat] no abnormalities.

3: A float is seen for a coat for a while (6 to 20% or less of area).

2. There are many coats (not less than 21% of area), and a float is seen. . A cost separates thoroughly.

(0053)(Wet surface morter adhesion) The resin composite was applied by 100-micrometer thickness on the wet surface mortar board, it was neglected on the 1st, the cross cut of the cured film was created and carried out, and the following standard estimated the peeling condition in the taps. 5: With [a cost] no abnormalities.

There are many coats (not less than 21% of area), and a float is seen. A float is seen for a coat for a while (6 to 20% or less of area). 4; A float is seen for a coat alightly (5% or less of area).

micrometer thickness on the wet surface light-calcium-carbonate board, it was neglected on the 1st, the cross cut of the cured film was created and carried cut, and the following standard estimated the peeling (0054)(Wet surface light-calcium-carbonate board adhesion) The resin composite was applied by 100-: A coat separates thoroughly.

With [a coat] no abnormalities. condition in the tape

2. There are many coats (not less than 21% of area), and a float is seen. A float is seen for a coat for a while (6 to 20% or less of area). A float is seen for a coat slightly (5% or less of area).

0055]It is the following about an obtained result. It was shown in [Table 1]. A coat separates thoroughly.

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JP, 2000-119488, A [DETAILED DESCRIPTION]

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0057]When the comparison resin composite 1 of the comparative example 1 which does not contain a (***) silane compound, also when the comparison resin composite 2 of the comparative example 2 containing an ngredient only of a (b) ingredient is used so that more clearly than the above-mentioned result, Even if idhesion to the painted surface is insufficient and it is using together an epoxy resin and a tetra alkoxy pooxy resin which the (b) ingredient has not added is used as an apoxy resin, adhesion has the fault of

resin composites 2-10 of Embodiments 2-10 which consist of a modified epoxy resin of a (b) ingredient and tetra alkoxysilane of a (**) ingredient which are produced by adding the (b) alkoxy silane compound and (c) [0058]On the other hand, when the resin composites 1–10 of this invention of Embodiments 1–10 are used Excel in hardenability, excel in solvent resistance and adhesion to all fields, and it divides, (a) When the dicarboxylic soid to an epoxy compound are used, especially, it excels in adhesion to a wet surface Effect of the Invention]The resin composite of this invention has a quick cure rate, and the paint excellent n anti-corrosivencss, adhesion, hardenability, solvent resistance, and hardencd material physical properties can be given.

Translation done.